

Claims

- [c1] Method of increasing mobility of charge carriers in a bipolar device comprising the steps of:
creating compressive strain in the device to increase mobility of holes in the device; and
creating tensile strain in the device to increase mobility of electrons in the device.
- [c2] The method of claim 1 wherein:
the bipolar device is an n-p-n transistor; and
hole mobility is increased in a lateral direction and electron mobility is increased in a vertical direction.
- [c3] The method of claim 1 wherein:
the bipolar device is a p-n-p transistor; and
electron mobility is increased in a lateral direction and hole mobility is increased in a vertical direction.
- [c4] The method of claim 1 including the step of creating compressive and tensile strain by applying a stress film adjacent an emitter structure of the device and atop a base film of the device.
- [c5] The method of claim 1 including the step of locating the compressive and tensile strain in close proximity to an

intrinsic portion of the device.

- [c6] The method of claim 1 including the step of creating the compressive and tensile strain by applying a stress film in close proximity to an intrinsic portion of the device.
- [c7] The method of claim 1, wherein the stress film comprises nitride.
- [c8] The method of claim 1, wherein the stress film has at least 0.5GPa intrinsic stress.
- [c9] Bipolar device, comprising:
 - a collector region,
 - a base film disposed atop the collector region;
 - an emitter structure formed atop the base layer; and
 - a stress film disposed adjacent the emitter structure and atop the base film.
- [c10] The bipolar device of claim 9, wherein the stress film is disposed in close proximity to an intrinsic portion of the device.
- [c11] The bipolar device of claim 9, wherein:
 - the emitter structure is "T-shaped", having a lateral portion atop an upright portion;
 - a bottom of the upright portion forms a contact to the base film; and

the lateral portion overhangs the base film.

[c12] The bipolar device of claim 9, wherein the stress film is a compressive film.

[c13] The bipolar device of claim 9, wherein the stress film is a tensile film.

[c14] The bipolar device of claim 9, wherein the stress film comprises nitride.

[c15] The bipolar device of claim 9, wherein the stress film has at least 0.5GPa intrinsic stress.

[c16] Bipolar device comprising:
means for creating compressive strain in the device to increase mobility of electrons in the device; and
means for creating tensile strain in the device to increase mobility of holes in the device.

[c17] The bipolar device of claim 16, wherein the compressive and tensile strain are located in close proximity to an intrinsic portion of the device.

[c18] The bipolar device of claim 16, wherein the means for creating compressive and tensile strain is a stress film disposed in close proximity to an intrinsic portion of the device.

[c19] The bipolar device of claim 18, wherein the stress film comprises nitride.

[c20] The bipolar device of claim 18, wherein the stress film has at least 0.5GPa intrinsic stress.